

Disinfection Methods and Equipment

INTERIM—Recommended Standards and Guidance for
Performance, Application, Design and Operation & Maintenance



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Preface

The recommended standards contained in this document have been developed for statewide application. Regional differences may, however, result in application of this technology in a manner different than it is presented here. In some localities, greater allowances than those described here may reasonably be granted.

In other localities, allowances that are provided for in this document may be restricted. In either setting, the local health officer has full authority in the application of this technology, consistent with Chapter 246-272 WAC and local jurisdictional rules. If any provision of these recommended standards is inconsistent with local jurisdictional rules, regulations, ordinances, policies, procedures, or practices, the local standards take precedence. Application of the recommended standards presented here is at the full discretion of the local health officer.

Local jurisdictional application of these recommended standards may be:

- 1) **Adopted as part of local rules, regulations or ordinances**—When the recommended standards, either as they are written or modified to more accurately reflect local conditions, are adopted as part of the local rules, their application is governed by local rule authority.
- 2) **Referred to as technical guidance in the application of the technology**—The recommended standards, either as they are written or modified to more accurately reflect local conditions, may be used locally as technical guidance.

Application of these recommended standards may occur in a manner that combines these two approaches. How these recommended standards are applied at the local jurisdictional level remains at the discretion of the local health officer and the local board of health.

The recommended standards presented here are provided in typical rule language to assist those local jurisdictions where adoption in local rules is the preferred option. Other information and guidance is presented in text boxes with a modified font style to easily distinguish it from the recommended standards.

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- ❑ Washington State On-Site Sewage Association (WOSSA)
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Introduction—

There is a direct link between this document about disinfection methods and equipment and another recommended standards and guidance document: Effluent Quality-Based Drainfields. In the design of on-site wastewater treatment systems, as site limitations increase so does the needed level of pre-treatment performance. For the most marginal of sites, Chapter 246-272 WAC imposes two performance standards: Treatment Standard 1 (TS1) and Treatment Standard 2 (TS2). These are stringent wastewater treatment standards. Not all systems or products meet them.

Performance results of some systems may meet two, but not all three, of the performance parameters. An example of this exists with the intermittent sand filter. Its performance level meets all the parameters of Treatment Standard 2, but can meet only the BOD₅ and TSS parameters of Treatment Standard 1, as the system effluent fecal coliform counts exceed the fecal coliform criteria for Treatment Standard 1.

Other systems or products may have been researched or tested, but effluent samples were analyzed for only two of the three parameters. An example of this exists with some aerobic treatment units (tested to the National Sanitation Foundation (NSF) Standard No. 40). This test protocol evaluates products for only two of the three performance parameters: BOD₅ (most recently CBOD₅) and TSS. As such, no comparable test data exist for fecal coliform reduction performance of these units.

In order for these systems to be used on sites where Treatment Standards are required to be met, disinfection methods and equipment must be incorporated in the design and operation of the on-site wastewater treatment system. This document addresses the various aspects of disinfection methods and equipment: Performance, Application, Design, and Operation & Maintenance.

What is meant by “INTERIM” recommended standards and guidance for disinfection methods and equipment?

“Interim” is used in the title of this document to suggest that the framework or process for selection of disinfection equipment is in a state of flux. While disinfection equipment has been used in Washington for several years, product and/or on-site sewage system performance has fallen short of Treatment Standard 1 and 2 expectations. This document outlines an attempt to provide a higher level of assurance of a proper match between disinfection methods / equipment and the other wastewater treatment and disposal components of on-site sewage systems.

With the increasing demand for options on limited sites, disinfection equipment manufacturers are beginning to subject their equipment to testing protocols consistent with the rigors of ANSI/NSF Standard 40. It is hoped that in the near future disinfection equipment manufacturers will have product performance test results that will allow accurate matching of alternative pre-treatment units with specific effluent disinfection equipment. This is contrasted with the current status where proper selection of add-on disinfection must rely on engineering judgement alone.

In the future, if the trend toward product performance testing for fecal coliform continues, on-site sewage system designers will be able to match known fecal coliform reduction levels of various alternative pre-treatment units with the tested influent and effluent capacity of various disinfection equipment options. Knowing the fecal coliform reduction capacity of both pre-treatment unit and disinfection equipment will provide an alternative to subjecting specific pre-treatment units with specific disinfection equipment to ANSI/NSF Standard 40 testing. By independently testing both—pre-treatment units and disinfection equipment—to the same level of testing scrutiny, determining each unit’s fecal coliform reduction capacity and their specific wastewater application needs (such as turbidity range, pretreatment needs, etc.), a high level of performance assurance (equal to testing specific models & equipment or methods together) can be achieved. It is hoped that as these potential changes occur in the wastewater treatment industry, the approaches to disinfection equipment selection presented in this document can be modified to simplify the process while maintaining public health protections.

1. Performance Standards—

- 1.1. Listing**—Unlike other proprietary wastewater treatment products, disinfection equipment is not currently required to be included on the List of Approved Systems and Products before a local health jurisdiction may issue an installation permit for an on-site wastewater system incorporating disinfection equipment.

At the current time the Department of Health does not review and list proprietary disinfection methods or equipment. The National Sanitation Foundation is in the process of developing a testing protocol and listing program for wastewater disinfection products. The department and the Technical Review Committee (TRC) looks forward to the opportunity to review the new standards and to consider them for adoption and use in Washington. Being able to reference such a national standard would allow the DOH to embark on a product review, approval and listing program, similar to other proprietary wastewater treatment products.

- 1.2. Performance Evaluation Criteria**—The following criteria must be used to evaluate disinfection methods and equipment to be used with an on-site sewage system:

- 1.2.1.** The disinfection method and equipment must be capable of disinfecting the pre-treatment unit effluent to meet the fecal coliform criteria of the Treatment Standard required by the site.
- 1.2.2.** The service interval for the disinfection equipment must be consistent with the service interval of the on-site sewage system to which it is connected.

Service interval is the time period between planned site visits to perform various system monitoring functions such as checking equipment, renewing depleted disinfectant chemical supply, or collecting samples. The service intervals may be specified by contracts, operation plans, or local health jurisdiction permits.

- 1.2.3. Interim Disinfection Methods & Equipment Certification**—When site conditions require a treatment system capable of meeting Treatment Standard 1 or 2, treatment units listed by the DOH as only meeting the BOD₅ and TSS requirements for Treatment Standards 1 and 2, but not the fecal coliform parameter, may be used only when disinfection is used to assure that the fecal coliform parameter of the Treatment Standard is met. In this situation either (a) or (b), below, must be met.
- (a) A licensed engineer or licensed on-site sewage system designer certifies (affixes his/her seal) that the equipment specified will meet the pathogen indicator parameter of Treatment Standard 1 or 2. This certification may be on a site-by-site basis (certification is provided to the permitting authority), or on a typical system application basis (certification may be either to the permitting authority—for local use only—or to the DOH). In either case the disinfection equipment and on-site sewage system design specifications of the engineer / designer must be followed.
 - (b) A treatment unit manufacturer certifies to the DOH specific disinfection equipment to be used with their treatment units that will meet the pathogen indicator parameter of Treatment Standard 1 or 2. This certification would be on a typical-system application basis. Where a treatment unit manufacturer has certified specific types, brands and

models of disinfection equipment to be used with their treatment unit, only these disinfection products must be used.

Certification of Disinfection Equipment—

The purpose of certification of disinfection equipment for use with on-site sewage treatment systems is to help assure that the equipment selected will perform as needed for the overall system to meet the performance standards required by the site. This certification may be accomplished on either a site-by-site or a typical system application basis. Examples of these two approaches:

Site-by-site: *A licensed professional engineer (PE) or licensed on-site sewage system designer selects and specifies by supplier, brand, and model, disinfection equipment, methods and materials for a specific site development plan. The engineer / designer may perform the entire on-site sewage treatment system design or just the selection / specification of the disinfection equipment for the system. In either case the PE / designer provides written documentation / specifications and affixes his / her seal to certify to the permitting authority that the selected disinfection equipment / materials will meet the required pathogen indicator parameter of the applicable treatment standard.*

Typical-System Application: *A licensed professional engineer (PE), licensed on-site sewage system designer, or the treatment unit manufacturer selects and specifies by supplier, brand, and model, disinfection equipment, methods and materials for a typical site development plan. The engineer / designer or treatment unit manufacturer must also specify any and all design elements necessary to characterize the “typical system” for which the selected disinfection equipment, methods and materials will provide the needed disinfection performance. Written documentation / specifications are provided by the PE / designer or the manufacturer to the local permitting authority or the DOH to certify that the selected disinfection equipment / materials will meet the required pathogen indicator parameter of the applicable treatment standard when applied to a site that meets the design elements of the identified “typical system”. The PE / designer must affix his / her seal to, and sign, the certification document.*

2. Application Standards—

2.1. Permitting—

2.1.1. An installation permit and, if required, an operational permit must be obtained from the local health jurisdiction before installation of an on-site sewage system.

2.1.2. For sites where either Treatment Standard 1 or 2 must be met, some means acceptable to the local health jurisdiction must be implemented to assure proper on-going operation and maintenance (O&M) of the on-site sewage system components as long as the facility is served by the on-site sewage system. The following options may be used separately or in combination. Approaches to assuring long-term O&M of on-site sewage systems include:

- (a) recording the requirement for an on-going service contract on the property deed;
- (b) issuing an operating permit (in addition to the initial installation permit), with the requirement for maintaining a service contract; and,
- (c) requiring a management entity to provide O&M assurance. Examples of management entities include: cities & towns, public utility districts, water & sewer districts, special-use districts, corporations and home-owner associations with demonstrated capacity to assure long-term management.

2.1.3. Local health jurisdictions may implement O&M assurance measures (see subsection 2.2.2) for sites other than those where Treatment Standard 1 or 2 is required to be met.

2.2. Model / Size Selection—

2.2.1. Site-by-site Certification—As outlined in subsection 1.2.3, specific disinfection equipment is specified by a licensed PE or on-site sewage system designer.

2.2.2. Typical-System Certification—As outlined in subsection 1.2.3, the selected disinfection equipment must match the design element identified by the equipment certifier, such as daily design flow, wastewater strength, turbidity, chemical-contact time (chamber), etc.

2.3. System Design Elements Needed to Accommodate Disinfection Equipment—Various system design elements must be considered in the application of disinfection equipment to an on-site sewage system. Such items include, but are not limited to, chemical disinfection levels and residuals, environmental impact of chemical residuals, tanks and/or piping considerations relating to providing adequate contact-time, etc. The overall system design and installation must meet these various disinfection equipment needs to assure satisfactory disinfection of the wastewater.

2.4. Access Ports—

2.4.1. Ground-level access ports must be sized and located to facilitate installation, removal, sampling, examination, maintenance, and servicing of components or compartments that require routine maintenance or inspection. Access ports must be sufficiently sized and located to facilitate:

- (a) visually inspecting and removing mechanical or electrical components;
- (b) removing components that require periodic cleaning or replacement;
- (c) visually inspecting and collecting samples; and,
- (d) removing (manual or pumping) accumulated residuals.

2.4.2. Access ports must be protected against unauthorized intrusion. Acceptable protective measures include, but are not limited to padlocks or covers that can be removed only with tools.

2.5. Data plate—

2.5.1. The disinfection equipment must have permanent and legible data plates located on the equipment assembly, or access riser at a location accessed during maintenance cycles and inspections.

2.5.2. Each data plate must include:

- (a) manufacturer's name and address;
- (b) model number;

- (c) serial number;
- (d) rated hydraulic capacity of the system; and,
- (e) performance expectations, in terms of fecal coliform levels in the disinfected effluent.

2.6. Installation—Disinfection equipment must be installed:

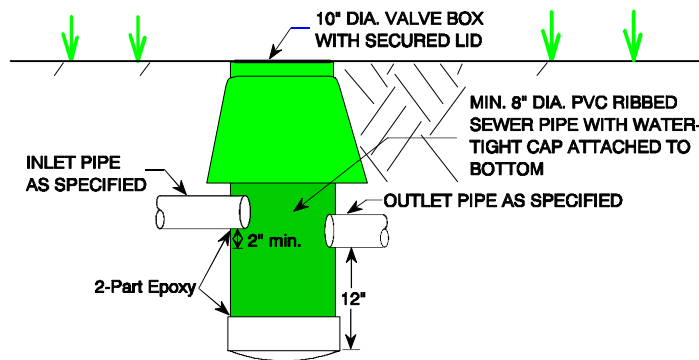
- 2.6.1.** according to the manufacturer's instructions in compliance with state and local codes;
- 2.6.2.** in a location easily accessible by service personnel, providing access during normal business hours without the need for the homeowner / system owner to be at the service site;
- 2.6.3.** in a location where potential for intentional or unintentional damage or disruption of service is minimized;
- 2.6.4.** such that electrical power can not be inadvertently disconnected from the device or alarms; and,
- 2.6.5.** with an alarm to alert the homeowner / system owner if the equipment has failed or is in need of non-routine service.

2.7. Sampling Ports—

- 2.7.1.** Sampling ports must be designed, constructed, and installed to provide easy access for collecting a "free fall" water sample from the wastewater stream.
- 2.7.2.** A sampling port must be located downstream of the disinfection equipment (including the contact chamber if chemical disinfection is used) so samples will accurately reflect disinfection performance.
- 2.7.3.** The sampling port may be located within the disinfection equipment or other system component (such as a pump chamber) provided that the wastewater stream being sampled is representative of the effluent stream from the disinfection equipment.

*Sample ports are installed for diagnostic activities and/or confirming compliance with system performance requirements. From a diagnostic standpoint, multiple sites for sampling, such as before and after disinfection, are beneficial. Samples are easier to obtain from a pressurized transport lines than gravity flow. Figure 1. illustrates a suggested method to access gravity flow for sample collection. **Free fall** is a term used to describe wastewater movement where samples should be taken to minimize contamination during collection. If collecting a sample from a discharge port under pressure, the water should be flowing freely and the collection container should not touch any part of the pipe work. When collecting a sample from gravity flow it should be taken from the flow as spill from a weir or drop to minimize possible contamination.*

Figure 1. In-line Sampling Port



2.7.4. Sampling ports must be protected against unauthorized intrusion. Acceptable protective measures include, but are not limited to a padlock or cover that can be removed only with tools.

3. Design—Disinfection equipment is almost exclusively proprietary, representing a wide variety of designs, materials used, and methods of assembly. As such, there are no specific recommended standards for the design of disinfection equipment.

4. Operation & Maintenance Standards—

4.1. General—

4.1.1. The owner of the residence or facility served by the disinfection equipment is responsible for assuring proper operation and providing timely maintenance of the disinfection equipment and all other components of the on-site wastewater treatment and disposal system.

4.1.2. The on-site wastewater system designer must instruct, or assure that instruction is provided to, the owner of the residence or facility regarding proper operation of the entire on-site wastewater system, including the disinfection equipment. This instruction should emphasize operating and maintaining the entire on-site wastewater system within the parameter ranges for which it is designed

4.1.3. A Service Contract for on-going service and maintenance of the entire wastewater system, as described in sections 4.4 of this standard, is required. The service and maintenance requirements may be modified by the local health jurisdiction, but as a minimum continued service and maintenance must be addressed for the life of the system by an operation plan.

The O&M Service Contract is the common vehicle by which the ATU industry assures satisfactory long-term operation of aerobic treatment systems. Each new unit purchase customarily comes with the initial 2-year service contract included in the purchase price. To help assure that system owners continue the contract relationship with a qualified service provider, the ATU industry generally encourages local permitting agencies to stipulate the requirement for an on-going service contract as one of the permit requirements. Such a requirement alone may encourage ATU owners to renew service contracts. For others, it places the local permitting agency in the role of “contract enforcement”.

Disinfection equipment manufacturers frequently design their products with O&M service intervals that are consistent with pre-treatment units such as ATUs. As such, the O&M Service Contract approach used by the ATU industry may serve as a suitable model for the disinfection equipment industry.

Other approaches to assuring long-term O&M of disinfection equipment includes:

- ☒ *recording the requirement for an on-going service contract on the property deed;*
- ☒ *issuing an Operating Permit (in addition to the initial installation permit), with the requirement for maintaining a service contract; or*
- ☒ *requiring a management entity to provide O&M assurance. Examples of management entities include: cities & towns, public utility districts, water & sewer districts, special-use districts, and corporations and home-owner associations with demonstrated capacity to assure long-term management.*

Disinfection equipment needs servicing consistent with the product manufacturer’s recommendations to assure long-term system performance. Particularly where disinfection equipment performance is being relied upon to provide public health and environmental protection on marginal sites with limited vertical separation, size, and soil-treatment potential, local permitting agencies are encouraged to identify and implement O&M assurance management elements appropriate for their jurisdictions.

4.2. Limited warranty—

- (a) The disinfection equipment manufacturer must: warrant all components of the disinfection equipment to be free from defects in material and workmanship for a minimum of 2 years from the date of installation; and,
- (b) fulfill the terms of the warranty by repairing or exchanging any components that, in the manufacturer's judgment, show evidence of defect.

4.3. Owner's manual—The on-site wastewater system designer must develop / assemble a comprehensive owner's manual presenting information about the entire on-site sewage system. This manual must include information about the disinfection unit. For specific treatment system information needs, see the Recommended Standards and Guidance of the treatment component (e.g. ATU, Sand Filter Systems, Mound Systems, etc.). The manual may be a collection of individual system component manuals and must address:

- (a) general system information
- (b) system installation procedures;
- (c) operation and maintenance schedules;
- (d) troubleshooting and repair guidance; and
- (e) as-built plans with the name and contact number of the engineer/designer and installer.

4.4. Service-related obligations—

- 4.4.1.** The entire on-site wastewater treatment and disposal system with disinfection equipment must be assured proper O&M through an initial and renewed service contract for the life of the system or other means approved by the local health jurisdiction. A single service contract and service provider for both the disinfection equipment and the other system components is preferable to multiple contracts for service providers.
- 4.4.2.** Service providers must maintain accurate records of their service contracts, customers, performance data, and time lines for renewing the contracts. These records must be available for inspection upon request by the local health jurisdiction. The local health jurisdiction may require copies of these records to be submitted to the local health agency responsible for permitting the system.
- 4.4.3.** The disinfection equipment service provider must possess adequate knowledge and skill regarding on-site wastewater treatment, effluent disposal concepts and system function. The service provider must be:
- (a) product-certified by each manufacturer for any disinfection equipment they intend to service;
 - (b) able to provide documentation of product certification as evidence upon request; and,
 - (c) able to demonstrate competency in the servicing (Operation & Maintenance) of on-site sewage systems.

Completion of a course of instruction at the Northwest On-Site Wastewater Training Center / Puyallup, Washington, or other equivalent training facility may be most useful to the O&M professional. Completion of such courses as Basics of Operation, Maintenance, and Monitoring may help develop the knowledge and skills needed to provide appropriate O&M to the wide range of on-site sewage systems needing routine servicing.

- 4.4.4.** O&M service contracts establish the initial and on-going relationship between the O&M service provider and system owner. The service provider may be the disinfection equipment manufacturer / service representative or the system owner. The contract must identify the roles and responsibilities assigned to the service provider. The specifics of O&M service contracts may vary product-to-product and locality-to-locality, but all O&M service contracts must include information / conditions of agreement such as:
- (a) owner's name & address;
 - (b) property address & legal description;
 - (c) local health jurisdiction permit requirements;
 - (d) specific contacts / owner address, service provider, and local health jurisdiction;
 - (e) detail of service to be provided;

- (f) schedule of service provider duties;
- (g) cost and length of service contract / time period;
- (h) details of product warranty;
- (i) owner's responsibilities / under the contract and routine operation of the wastewater treatment and disposal system;
- (j) document recording, such as notification to the mortgage-holder or attachment to the deed of trust; and,
- (k) document verification / notary public.

4.4.5. O&M service record keeping and reports required for the local health jurisdiction must specify:

- (a) what data is to be reported;
- (b) to whom the reports are to be submitted;
- (c) the format for presenting information; and,
- (d) the frequency of reporting.

Appendix A

Monitoring: Impact of Site Limitations and System Complexity—

The monitoring frequency and level of detail information reported relates to limitations presented by site conditions and system complexity. Monitoring and reporting to assure proper function becomes increasingly critical for more vulnerable sites and/or complex systems. This concept, which is applied to all conventional and alternative on-site sewage treatment systems, is illustrated by Tables A and B which may be used to guide decisions related to monitoring and reporting.

Table A.
Relationship Between Site Limitations and System Complexity for Conventional and Alternative On-Site Sewage Treatment Systems

Issue	Characteristics / Level of Limitation and Complexity		
	Lower		Higher
Site Limitation	Meets state rules for conventional gravity system	Meets state rules for conventional pressure distribution system	Limitation increases with - less vertical separation, smaller lot sizes, less horizontal separation, and, greater surface slope, wastewater flow, wastewater strength, etc.
System Complexity	Gravity-flow (no pumps, controls, etc.)	Pressurized distribution (requires pumps & controls)	Complexity increases with - increasing reliance upon, or combinations of: pumps; blowers; motors; mechanical, electronic, or computer-operated controls & warning devices; disinfection (materials & equipment); reduction in drainfield size; quality control of artificial (non-original soil) treatment media, etc.

Table B.
Suggested Monitoring Frequency Based Upon Site Limitations and System Complexity for Conventional and Alternative On-Site Sewage Treatment Systems

	Level			
Site Limitation	Low	Low	High	High
System Complexity	Low	High	Low	High
Monitoring Frequency	<i>Low = Annually</i>		<i>Medium = Semi-annually</i>	<i>High = Quarterly, or greater</i>

Appendix B

GLOSSARY OF TERMS—

<i>Term</i>	<i>Meaning / Description</i>
Biochemical Oxygen Demand (BOD₅)	A test which measures the molecular oxygen used by microorganisms during a five day incubation period at a temperature of 20°C (68°F) for the biochemical degradation of organic material (CARBONACEOUS DEMAND), and the oxygen used by microorganisms to oxidize inorganic material such as sulfides and ferrous iron. It also may measure the amount of oxygen used to oxidize reduced forms of nitrogen such as ammonia and organic nitrogen (NITROGENOUS DEMAND) if the microorganisms capable of mediating the reaction are present in the sample. .
Carbonaceous Biochemical Oxygen Demand (CBOD₅)	Same as the 5-day biochemical oxygen demand (BOD ₅) test, except that the NITROGENOUS DEMAND is <u>prevented</u> by addition of an inhibitory chemical to the sample.
Coliform (Bacteria)	A group of bacteria that produce gas and ferment lactose, some of which are found in the intestinal tract of warm-blooded animals. They are indicators of potential ground water and/or surface water contamination with such fecal material. . The coliform group of organisms includes all of the aerobic and facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35°
Designer	See Licensed On-site Sewage System Designer
Effluent	Liquid which is discharged from an on-site sewage system component, such as a septic tank (septic tank effluent) or sand filter (sand filter effluent).
Engineer	See Licensed Professional Engineer
Fecal Coliform (Bacteria)	Coliform bacteria specifically originating from the intestines of warm-blooded animals, used as a potential indicator of ground water and/or surface water pollution.
Influent	Wastewater, partially or completely treated, or in its natural state (raw wastewater), flowing into a reservoir, tank, treatment unit, or disposal unit.
Licensed On-Site Sewage System Designer	A person licensed by the Washington State Department of Licensing to match site and soil characteristics with appropriate on-site sewage technology.
Licensed Professional Engineer	A person licensed by the Washington State Department of Licensing as a professional engineer consistent with Chapter 18.43, RCW.
On-Site Sewage System	An integrated arrangement of components for a residence, building, industrial establishment or other places not connected to a public sewer system which: <ul style="list-style-type: none"> (a) Convey, store, treat, and/or provide subsurface soil treatment and disposal on the property where it originates, upon adjacent or nearby property; and (b) Includes piping, treatment devices, other accessories, and soil underlying the disposal component of the initial and reserve areas.
Pressure Distribution	A system of small diameter pipes that apply effluent fairly uniformly over the entire absorption area, as described in the "Recommended Standards and Guidance for Pressure Distribution Systems" by the Washington State Department of Health. (See Conventional Pressure Distribution System.)
Routine Servicing	Servicing all system components as needed, including product manufacturer's requirements / recommendations for service.
Service Interval	The time period between planned site visits to perform various system monitoring functions such as checking equipment, renewing depleted disinfectant chemical supply, and collecting samples. The service intervals may be specified by contracts, operation plans, or local health jurisdiction permits.
Sewage	Any urine, feces, and the water carrying human wastes including kitchen, bath, and laundry wastes from residences, building, industrial establishments or other places. For the purposes of this document, "sewage" is generally synonymous with domestic wastewater. Also see "residential sewage."
Total Suspended Solids (TSS)	Suspended solids refer to the dispersed particulate matter in a wastewater sample that may be retained by a filter medium. Suspended solids may include both settleable and unsetttable solids of both inorganic and organic origin. This parameter is widely used to monitor the performance of the various stages of wastewater treatment, often used in conjunction with BOD ₅ to describe wastewater strength. The test consists of filtering a known volume of sample through a weighed filter membrane that is then dried and re-weighed.

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Treatment Standard 1	A thirty-day average of less than 10 milligrams per liter of biochemical oxygen demand (5-day, BOD ₅ , 10 milligrams per liter total suspended solids (TSS), and a thirty-day geometric mean of less than 200 fecal coliform per 100 milliliters.
Treatment Standard 2	A thirty-day average of less than 10 milligrams per liter of biochemical oxygen demand (5-day, BOD ₅ , 10 milligrams per liter total suspended solids (TSS), and a thirty-day geometric mean of less than 800 fecal coliform per 100 milliliters.